

Level 1/2 Vocational Award in  
**ICT**  
(Technical Award)



# Knowledge Organiser End of Year Exam






Name:

# 1.1.1 Hardware Devices and

# 1.1.2 Functionality of Different Software



# Computing Devices

Device	Use
<p>Personal Computer</p> 	<p>Used to carry out tasks such as word processing, spreadsheet modelling. You can also use complex software for image / animation design. A personal computer can be used to browse the Internet and play games, as well as communication such as email. A PC is fixed, as you cannot move it around due to wired connections.</p>
<p>Smartphone</p> 	<p>Used to carry out tasks such as making telephone calls, sending messages (text and email) and calendar activities. Can be used for social media and games. Can be used for office software but a smaller version.</p>
<p>Tablet</p> 	<p>Used to carry out tasks such as word processing, spreadsheet modelling. You can also use software for image / animation design. A tablet can be used to browse the Internet and play games, as well as communication such as email. You can stream videos and watch online TV services.</p>
<p>Laptop</p> 	<p>Used to carry out tasks such as word processing, spreadsheet modelling. You can also use complex software for image / animation design. A laptop can be used to browse the Internet and play games, as well as communication such as email. A laptop allows the user to move around, so they are not fixed in one place.</p>
<p>Games console</p> 	<p>Used to play games that are made for that specific console. Has online functionality to be able to communicate with other players.</p>


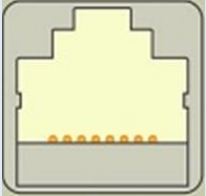
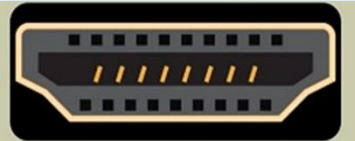

# Input Devices

Device	Description of use
Mouse	Used to help the user navigate the screen and select areas of the screen (for example, click an option / hyperlink).
Keyboard	Allows the user to send data to the computer by typing letters, numbers and symbols. Has keys that perform specific jobs.
Touch Screen	Allows the user to send data to the device by selecting options or typing on screen. A touch screen is an input and an output device.
Scanner	Allows the user to turn a physical item into something digital. An example is to make a copy of a letter you may have received.
Games Controller	Used to allow the user to play games. It can control what the user wants to select and allow the control of a character.
Microphone	Used to allow the user to input or record their voice. Works with a CODEC to turn an analogue signal into digital.
Camera	Allows the user to send any photographs taken to the computer for editing or storage.

# Output Devices

Device	Description of use
Monitor	Allows the user to see the outcome of what they are doing on the device.
Touch Screen	Allows the user to see the outcome of what they are doing on the device. It is also an input device.
Projector	Allows the user to see the outcome of what they are doing on the device, but on a larger scale.
Speakers	Allows the user to be able to listen to sounds from the device. Can be heard by others.
Headphones	Allows the user to be able to listen to sounds privately from the device. Can only be heard by the user.
Lights	Allows the user to see the outcome of an action, for example if using a self service till, if an item hasn't scanned properly a light will start flashing to call for help.

# Computer Ports

Device	Description of use
VGA 	A VGA cable is used primarily to link a computer to a display device. One end of the VGA cable is attached to the port in the graphics card on the computer motherboard, and the other to the port in the display device.
Ethernet 	An Ethernet cable carries the broadband signals between your modem, router, computer and other wired internet-capable devices.
HDMI 	HDMI cable is used for the connection and transfer of audio and video to a variety of HD equipment, including the Blu-ray player, personal video recorder (PVR) and television.
USB 	The term USB stands for "Universal Serial Bus". USB cable assemblies are some of the most popular cable types available, used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more.

# System Software

What is the main purpose of System Software?

Software that allows the user to interact with the computer.  
The Operating System is an example of systems software.

Feature	How is this tool used by System Software?
Memory Management	This ensures that programs/data do not corrupt each other and is stored in correct memory locations.
Process control/scheduling	This ensures that programs/data do not corrupt each other and is stored in correct memory locations.
File/folder management	This allows users to store files in a logical structure.
User management/access levels	This will allocate the user with an account which will give them access to files based on the permissions set by an administrator.
Peripheral devices/device drivers	Each peripheral device will contain software called a driver that will allow the device to communicate with the CPU. In the modern era of technology, this would be referred to as 'plug and play'.
User interface	This allows the user to interact with the computer.

# Utility Software

What is the main purpose of Utility Software?

Software that is responsible for maintaining and optimising the performance of a computer. It's designed to perform a number of housekeeping tasks. It's considered part of systems software.

Feature	How is this tool used by Utility Software?	How does it work?
<b>Anti-virus</b>	This is designed to detect and destroy computer viruses.	Antivirus products work by detecting, quarantining and/or deleting malicious code, to prevent malware from causing damage to your device.
<b>Backup</b>	The copying of physical or virtual files or databases to a secondary location for preservation in case of equipment failure or catastrophe.	A full backup is when a complete copy of all files and folders is made. Incremental backups requires at least one full backup be made, and then afterward only the data that has changed since the last full backup will be backed up again.
<b>Compression</b>	Reducing the size of the file by performing an algorithm on the original data	<u>Lossless</u> - Identifies patterns within the data that allows it to be stored more efficiently. The original file can be re-created as no data is lost <u>Lossy</u> - Discarding elements of file. Some of the original data is lost and the original file can not be re-created
<b>Defragmentation</b>	Defragmentation software groups fragmented files back together.	Files become fragmented when they need to be saved in a hard disk that is getting full. Defragmentation software finds related files and groups them together to improve the speed of the hard disk.
<b>Encryption</b>	Encryption means to scramble data in a way that it is unreadable to anybody who doesn't have a key to be able to unscramble this.	Data is encrypted using a key and then decrypted using a key.
<b>Firewall</b>	It is used to protect (a network or system) from unauthorized access.	To protect your system, a firewall checks the data coming in from the various parts of the internet and verifies that it is safe.



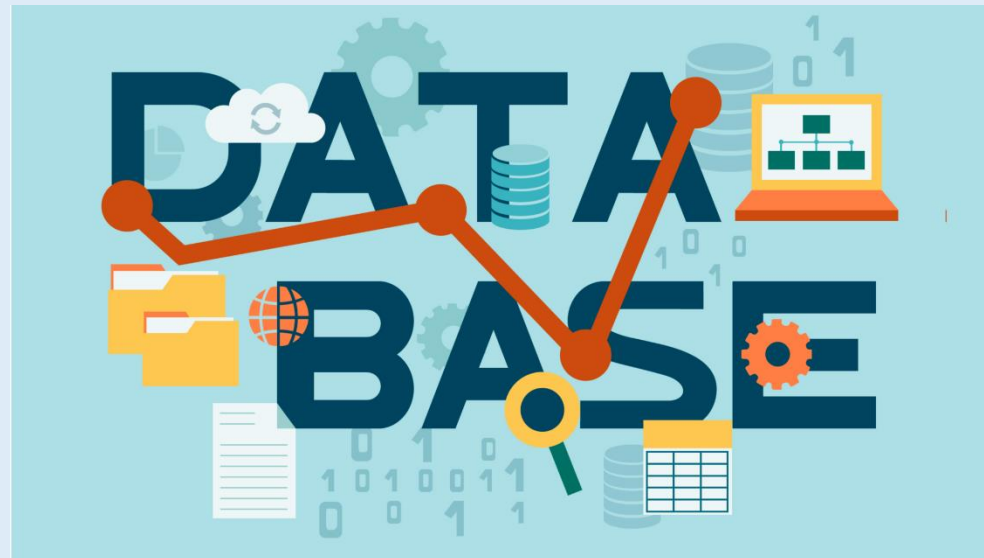
# Applications Software

What is the main purpose of Applications Software?

Software that is designed to perform a specific task. Some applications are designed to handle information, communicate with others or perform a specific set of functions for one particular organisation.

Feature	Explain what the applications are used for.	Example Software
E-Mail	To be able to communicate with others using electronic mail. The user will type their message and can attach files such as documents, images or videos.	Outlook Gmail
Video conferencing	To be able to communicate with others using video calls. Allows meeting to take place without having to travel to another city or country.	Microsoft Teams Zoom Skype
Spreadsheet	To be able to produce calculations on data in order to analyse it. Uses lots of formulas and functions.	Microsoft Excel
Instant messaging	To be able to communicate with others by sending messages instantly. Media files such as images can also be sent using this method.	WhatsApp
Databases	To be able to store data in an organised way. Gives the user the ability to search for specific data.	Microsoft Access

## 2.1 Databases



# Databases

Databases are a way of storing data in a logical and structured way.

This is a flat database – one table

Pupil Id	Name	Date of Birth	Gender	Maths %	Welsh %
1134	Williams P	12/02/91	M	44	60
7679	Jones H	22/12/90	F	63	55
5532	Smith A	09/05/91	M	26	79
7823	Begum B	02/04/91	F	75	64
1298	Thomas A	25/09/90	M	88	73

**Records** – each row of data is known as a record.

# Primary and Foreign Keys

**Primary Key** – A unique identifier. This keeps all of the records in the database unique.

**Foreign Key** – This is used to link tables together and create a relationship. It is a field in one table that is linked to the primary key in another table.



 = primary key

 = foreign key

# Advantages of Databases

- They are faster / easier to update
- Faster / easier to search
- Easier to read compared to handwriting on paper based data
- Save on physical storage space (no cabinet storage needed)
- Can use mail merge to create lots of documents quickly
- Easier to generate backups
- Easy to produce reports
- Validation to reduce data entry errors

# Data Types

<b>Alphanumeric or Text</b> This allows you to type in text, numbers and symbols	Forename: James Surname: Smith Address: 73, High Street Postcode: CV34 5TR
<b>Number</b> This allows a whole number or a decimal number	15 21.35
<b>Currency</b> This automatically formats the data to have a £ or \$ or Euro symbol in front of the data and also ensures there are two decimal places.	£5.75 \$54.99
<b>Date/Time</b> This restricts data entry to 1-31 for day (28 or 30 in appropriate months) and 1-12 for month.	Long Date: 20 February 2006 Medium Date: 20-Feb-06 Short Date: 20/02/06
<b>Autonumber</b> This datatype will automatically increase by 1 as records are added to the database	Record 1: 1 Record 2: 2
<b>Logical, Boolean, Yes/No</b> The data is restricted to one of only two choices	Yes/No Male/Female

# Data, Information and Knowledge

**Data** – raw facts and figures e.g. 24042013

**Information** – processed data that has meaning e.g. 24/04/2013 is my dog's birthday.

**Knowledge** – apply rules and make deductions from this information to produce knowledge e.g. 24/04/2013 is my dog's birthday, which means in 2023 my dog will turn 10 years old.

# Encoding Data

This means to make the stored data shorter e.g. Male/Female becomes M/F.

## Why do we need to encode data?

- Consistency of data
- Quicker to type as you are not typing in the entire word
- Save memory / storage space
- Less chance of typing in errors
- Easier to check codes using validation checks
- Faster to access data / search for data



# Validation

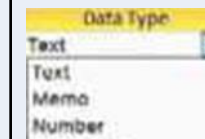
## Range Check

A range check ensures that data is between an upper and lower acceptable value, within a certain range.

$\geq 0$   
Price can't be a negative number

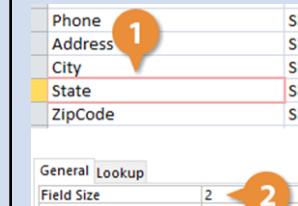
## Type Check

A type check ensures that the data entered is of an expected type, e.g. a number or date.



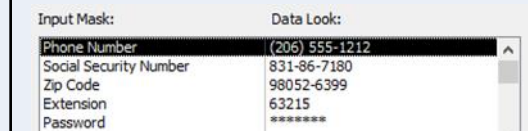
## Length Check

A length check ensures that the number of characters meets expectations, e.g. 8 character password.



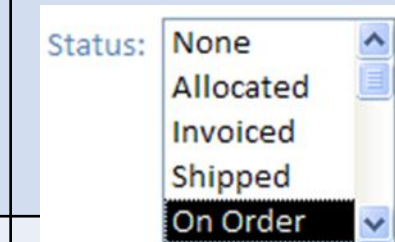
## Format Check

A format check ensures the data follows a set pattern (using an input mask).



## Drop Down Box

A drop down box ensures the user can only choose a predefined option from a list, reducing the chances of spelling mistakes or unwanted responses.



## Presence Check


A presence check ensures the user has at least entered something into the field, stopping them from accidentally leaving it empty.

Is Not Null  
You must enter a surname

# Search Criteria

To search a database, you need to specify the criteria to make sure you retrieve the correct results.

Every search consists of 3 parts:



Fieldname	Operator	Search Criteria
Make	=	Ford

This would look for all cars made by Ford.

# Complex Search Example

This would look for all item that are size large that are to be delivered to the customer.

Fieldname	Operator	Search Criteria
Home Delivery	=	Yes

AND

Fieldname	Operator	Search Criteria
Size	=	Large

# Sorting Data

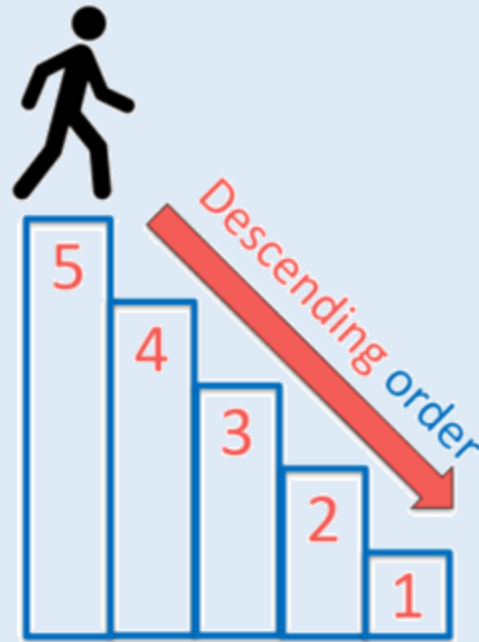
You may want to sort you data in a particular order:

**Ascending**  
smallest to largest



Ascending means going up

**Descending**  
largest to smallest



Descending means going down

**Ascending:**  
1-10 or A-Z

**Descending:**  
10-1 or Z-A

# Threats posed to data



## Physical threats

### Protection from fires

- Fires can be caused on purpose or as a result of a faulty electrical system.
- Another cause is overloaded electrical sockets, common in offices that use a large amount of computers.

### Protection from dust and extreme temperatures

- Large computers create a lot of heat.

### Computer theft

- Methods such as keyboard locks and passwords can be used to make sure that unauthorised people do not gain access to a system.

### Prevention methods include:

- Serial numbers attached to peripherals.
- Lock the case of the computer.
- Data needs to be backed up regularly.
- An ID badge system or use of biometrics to ensure authorised people have access.

## Malware

- This is a computer program that automatically copies itself so that can infect other disk drives or programs without the users knowledge.
- Most anti-malware software is used guard against damage to viruses.
- Be suspicious of software that is free to download as it may contain a virus.
- Making regular back-up copies is also recommended.

## Data loss

- The main cause of data loss is accidental damage. It most often results from carelessness by systems users.
- Computers themselves can develop problems such as being overloaded with software, or if they're nearing the end of their working life.
- One way of dealing with data loss is to limit access to a computers operating system, particularly for inexperienced users.
- Sometimes a simple command at the operating systems prompt could erase the entire hard disk.

# 1.4 Images



## Lesson 4: Static image files

### Description:

Static images are images that have no moving elements.

### File formats:

#### JPG:

- This is a bitmap image file format.
- Uses lossy compression.
- Commonly used to store photographs.

#### PNG:

- This is a bitmap image file format.
- Uses lossless compression.
- Supports transparency
- Commonly used for web graphics.

#### SVG

- This is a vector image file format.
- Uses lossless compression.
- Small in file size.
- Commonly used for web graphics.

#### TIFF

- This is a bitmap image file format.
- Uses lossless compression.
- Large in file size.
- Commonly used for print graphics.

## 2.4.2

## Level 1/2 Vocational Award ICT (Technical Award) Unit 2: ICT in Context



### Vector graphics



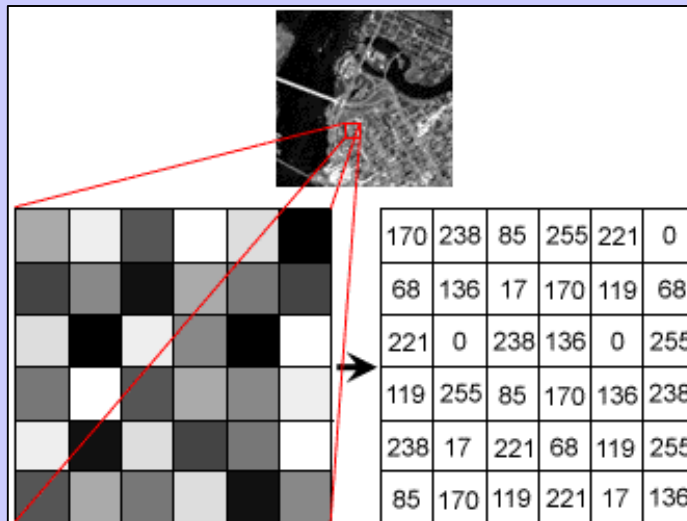
#### Examples:

- Made up of lines of curves using mathematical equations to determine the scale of the graphic.
- It doesn't use pixels and is not dependent on resolution.
- Commonly used to create logos.

### Bitmap images

#### Description:

Made up of pixels which help to determine the dimensions of an image which is measured by the number of pixels in height x number of pixels in length.



#### Resolution:

- The number of pixels stored in an image.
- Measured in PPI (Pixels per inch)/DPI (Dots per inch)
- Higher the resolution, the much sharper the quality of the image will be.
- Recommended resolution for a print graphic is 300 DPI.
- Recommended resolution for a web graphic is 72 DPI.

## 2.2 Spreadsheets





# Formatting

Fred's Classic Movie Events					
Venue	Fred's Movie Emporium		Today	13/12/2012	
Capacity	150				
Date	Movie	Tickets Sold	% of Capacity Sold	Tickets Remaining	% of Tickets to Sell
Wednesday 11 May 2011	Grease	50	33%	100	67%
Sunday 15 May 2011	Jaws	150	100%	0	0%
Monday 23 May 2011	Citizen Kane	105	70%	45	30%
Wednesday 01 Jun 2011	The Wizard of Oz	150	100%	0	0%
Friday 10 Jun 2011	Singin' In the Rain	85	57%	65	43%

# Spreadsheets can be known as Simulation Models

A simulation model copes a real life situation. You can use it to perform 'what if' investigations.

Examples include:

- Weather forecasting
- Financial forecasting
- Flight simulation.

## Formulas

Arithmetic operators   -   +   /   \*

## Functions

- **SUM** – Total
- **AVERAGE** – Mean average
- **MAX** – Highest
- **MIN** – Lowest
- **IF** – Used to predict outcomes.
  - Example =IF(D10>15,"Expensive","Good price")

	A	B	C	D	E	F	G
1		<b>Sainsbury's</b>	<b>Tesco</b>	<b>ASDA</b>	<b>Average</b>	<b>Minimum</b>	<b>Maximum</b>
2	<b>Loaf of bread</b>	0.75	0.73	0.7	=AVERAGE(B2:D2)	=MIN(B2:D2)	=MAX(B2:D2)
3	<b>Nescafe 100g</b>	2.52	2.55	2.51	=AVERAGE(B3:D3)	=MIN(B3:D3)	=MAX(B3:D3)
4	<b>Milk - 1 ltr</b>	0.55	0.55	0.52	=AVERAGE(B4:D4)	=MIN(B4:D4)	=MAX(B4:D4)
5	<b>Heinz baked beans</b>	0.76	0.78	0.73	=AVERAGE(B5:D5)	=MIN(B5:D5)	=MAX(B5:D5)
6	<b>Fairy washing liquid</b>	1.73	1.7	1.66	=AVERAGE(B6:D6)	=MIN(B6:D6)	=MAX(B6:D6)
7	<b>Kitchen rolls x 4</b>	1.99	1.99	1.85	=AVERAGE(B7:D7)	=MIN(B7:D7)	=MAX(B7:D7)
8	<b>Pedigree Chum</b>	0.7	0.69	0.66	=AVERAGE(B8:D8)	=MIN(B8:D8)	=MAX(B8:D8)
9	<b>Iceburg lettuce</b>	0.85	0.82	0.8	=AVERAGE(B9:D9)	=MIN(B9:D9)	=MAX(B9:D9)
10	<b>Total Costs</b>	=SUM(B2:B9)	=SUM(C2:C9)	=SUM(D2:D9)			